Seven months after the operation, cystoscopic examination was again done and the bladder neck looked quite smooth and there was no resistance to the passage of a No. 28 sound. The previously noted trabeculation on the area posterior to the trigone was still present. Retrograde pyelograms were normal. There was a tiny flat scar in the area where the diverticulum had been removed. A cystogram showed a slight flattening of the right side of the bladder. There was no roentgénographic evidence of retention of urine after voiding.

COMMENT

How the diverticulum came about in the present case is uncertain. The history would seem to indicate that the patient had had contraction of the neck of the bladder since childhood. However, another etiologic possibility is posed by the fact that only a little more than a year before the diverticulum was diagnosed the patient had been unconscious for 13 days following fracture of the skull and for at least part of that time had had distention of the bladder. The treatment necessitated two operations because when cystoscopic examination was first carried out it was hard to imagine that the very slight contracture of the neck of the bladder could cause sufficient obstruction to produce a diverticulum. However, when the bladder did not empty readily after the diverticulum was removed it became evident that the contracture caused more obstruction than had been recognized. Transurethral resection of the neck of the bladder gave complete relief.

1515 State Street, Santa Barbara.

REFERENCES

1. Burns, E.: Diverticula of the urinary bladder, Ann. Surg., 119:656-664, 1944.

2. Senger, F. L., Bottone, J. J., and Rothfeld, S. H.: Bladder diverticulum in the female, J. Urol., 68:699-702, 1952.

Carcinoid Tumor of the Rectum

LEWIS GRODSKY, *M.D.*, San Francisco

CARCINOID TUMORS of the rectum are uncommon, slow-growing but malignant submucosal lesions, having full potentialities for tissue invasion and widespread metastasis. In approximately 15 per cent of the total number of cases of rectal carcinoid tumor reported to date these lethal tendencies have been noted.[5] Raven[8] stated: "The formation of metastasis is only a matter of time although the degree of malignancy is less than in adenocarcinoma. As the tumor enlarges the cells will eventually transgress their barriers." The prognosis has proved favorable when the lesion was detected and removed in the early stage. The need for early clinical recognition and complete excision of rectal carcinoid tumor is therefore emphasized.

Stout[12] in a review of the literature in 1942 found reports of only six cases, to which he added six more. In the past decade reports of rectal carcinoid tumors have increased steadily, owing to advanced pathological knowledge and increasing medical acuity. At this date, the number of authenticated cases is approaching two hundred and the total is increasing constantly.

Carcinoid tumors can occur anywhere along the gastrointestinal tract where Kultschitzky basigranular cells are found. The majority of lesions are located in the appendix and ileocecal region. Grimes and Bell,[2] in an excellent review, reported on 20 treated patients with the intestinal carcinoid lesion, which summarized the experience at the University of California Hospital for the 21-year period 1927 through 1947. Eleven had tumors involving the appendix; in eight cases the small bowel, mainly the terminal ileum, was the site; and in one case the growth was in the cecum. The author's own search of the University of California Hospital and Proctology Clinic files showed carcinoid tumor to be less frequent in the rectal area than elsewhere in the gastrointestinal tract. In all the records examined, only three cases were noted, and in all three the lesion was in early stage.

From the Department of Surgery (Proctology), University of California School of Medicine, San Francisco.

Submitted January 3, 1955.

CLINICAL CONSIDERATIONS

Early rectal carcinoid tumors like simple adenomata cause no significant symptoms or diagnostic signs. Age, sex and racial distribution are variable and insignificant. Discovery is invariably made while investigating for an unrelated condition or on routine proctologic examination.

The early rectal carcinoid tumor is usually a single small (0.5 to 1.0 cm.) movable submucous nodule of a rather firm consistency. The nodule is covered by normal mucosa and projects boldly above the surface level. Usually it is of yellowish color—strikingly yellow on cut surfaces. Occasionally the lesions are polypoid in contour and even multicentric in origin. Adenomata can be present simultaneously.[7, 9, 11] The differential diagnoses to be considered are adenomata and submucosal tumors such as eleoma, lymphoma, fibromyoma, leiomyoma and sarcomatoma.[4]

Later, at variable and delayed periods of time, accelerated growth of the carcinoid tumor may involve both surface and deeper changes. Proliferation, infiltration and ulceration with local and widespread metastasis will produce all the characteristic signs and symptoms of an advancing adenocarcinoma of the rectum.[3, 6] Infrequently, small silent benign-appearing tumors have been indicted as the source of widespread metastases.[1, 10]

Treatment of rectal carcinoid tumor is dependent on the size and advancement of the lesion. An early single small (0.5 to 1.0 cm.) movable tumor in a

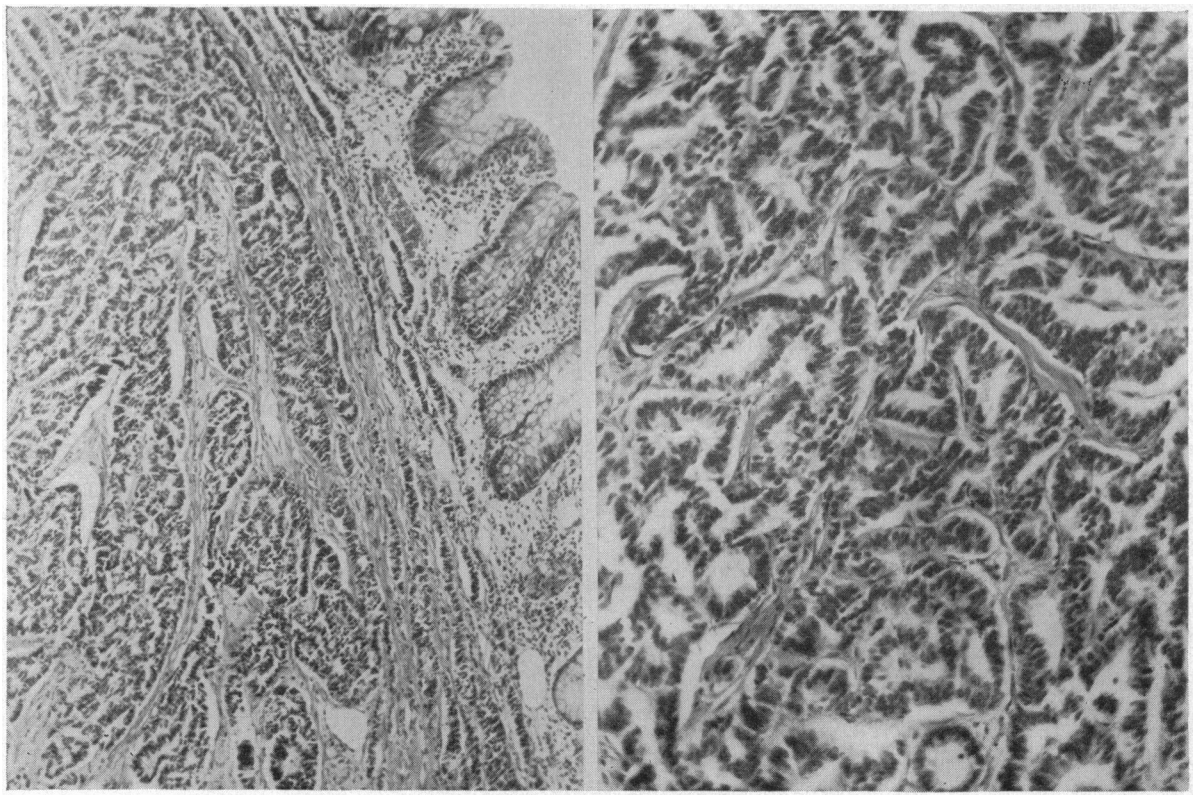

Figure 1.—(*Left*) Section showing an intact bowel mucosa with carcinoid cells arranged in columns and pseudoalveolar formation in the muscle fibers and connective tissue stroma of the submucosa (×80). (*Right*) Central portion of the tumor showing columns of carcinoid cells with hyperchromatic oval nuclei and scant cytoplasm arranged in a rosette and pseudoacinar pattern (×320).

favorable location is treated as an adenomatous polyp and removed in toto by scalpel or by electrosurgical snare with fulguration of the base. Pathological study of the entire specimen is preferable to study of a small preliminary biopsy specimen. The prognosis is excellent with early small tumors but pneumocolon and periodic follow-up are essential, as in adenoma. Multiple carcinoid tumors, those in unfavorable locations (above the peritoneal reflection), or recurrent lesions will require more radical procedures to insure safety. Larger lesions (over 2 cm.) showing clinically malignant signs such as infiltration, fixation or ulceration, should be treated by radical resection as in adenocarcinoma. The survival rate after radical operation has been good even in the presence of metastasis, because of the slow growth dynamics of carcinoid tumor.

PATHOLOGY

Examination of the excised tumor is the sole criterion by which an absolute diagnosis of rectal carcinoid tumor can be made.[4] Grossly, the early carcinoid specimen is firm and is covered by normal mucosa. It is hard to cut and is of rubbery consistency. Cut surfaces are smooth and homogeneous, often pale yellow due to the high lipoid content in the cytoplasm. Larger lesions are not so typical and there are more likely to be gross surface and degenerative changes similar to those of adenocarcinoma of the rectum.

Microscopically, the tumor consists of circumscribed submucosal nests, lobules, rosettes or columns of small fairly uniform, benign-appearing dark cells surrounded by muscle fibers and hyperplastic connective tissue stroma. Single or mixed patterns can occur in the same tumor and pseudoalveolar formations are often present. The individual cells have sharply demarcated, oval or rounded, hyperchromatic nuclei in a clear scant finely granular eosinophilic cytoplasm with an indistinct border. Argentaffin granules in the cytoplasm can reduce silver salt to brown-black particles, but this is inconstant in rectal carcinoid tumors because of a deficiency of the enteramine enzyme, which is more common in carcinoid tumors found elsewhere. Mitoses are usually sparse. The progressive malignant potentialities of the tumor cannot be prognosticated by the microscopic features as they can in other types of malignant lesions. Cells in advanced lesions and metastatic nodes may appear identical with those seen in early small benign-acting tumors.

CASE REPORTS

CASE 1. A 38-year-old white housewife was referred to the proctology clinic by the medical service in 1950, because of a firm asymptomatic rectal nod-

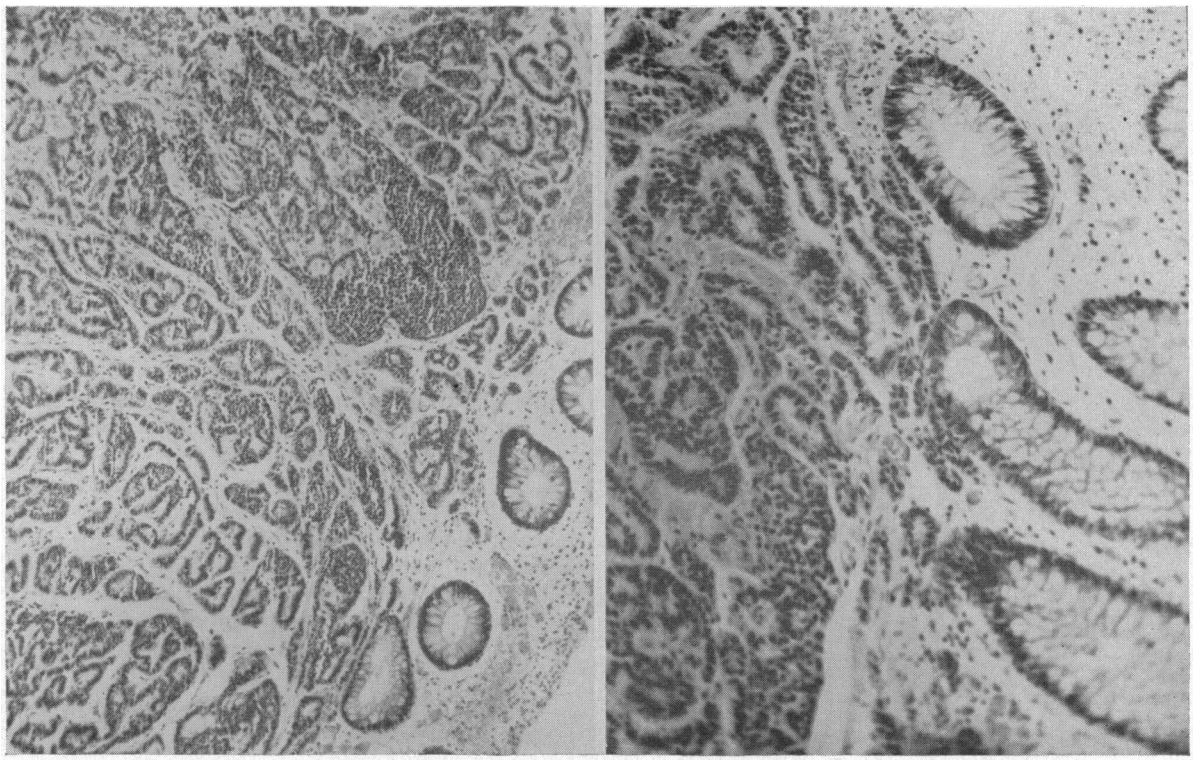

Figure 2.—*(Left)* Section showing circumscribed submucosal carcinoid cell nests, rosettes and ribbon-like column closely associated with an intact mucosa (×80). *(Right)* Carcinoid cells with basophilic oval nuclei appear to arise from the base of a crypt of Lieberkuhn (×160).

ule palpated on a routine physical examination. Upon proctologic examination a large anal skin tag, internal hemorrhoids and the firm palpable movable nodule on the right rectal wall about 9 cm. from the anus were noted. The nodule was about 0.8 by 1.0 cm. It projected sharply from the surface level and had normal mucosal cover. It seemed firmer than the usual adenomatous rectal polyp. Excision was done by diathermy snare and the base was fulgurated. The nodule was hard to cut. Cut surfaces were yellowish. The entire specimen was sent to the pathologist for study. The diagnosis was carcinoid tumor of the rectum (see Figure 1). There was no recurrence at the time of last examination, more than four years later.

CASE 2. A 46-year-old white male warehouseman was referred to the proctology clinic by the medical service in 1950, because of recurrent bright red rectal bleeding after bowel action for the previous year. Large prolapsing internal hemorrhoids and a projecting nodule about 0.5 cm. in diameter on the right rectal wall at the level of the second rectal valve were observed upon examination. The tumor was rather firm and was covered by normal mucosa. Excision was made by diathermy loop and the base was desiccated. The pathological diagnosis was carcinoid tumor of the rectum (see Figure 2).

CASE 3. A 52-year-old white male laborer was referred to the proctology clinic by the medical service in 1941, because of rectal bleeding and irregular bowel action for three months. The patient was

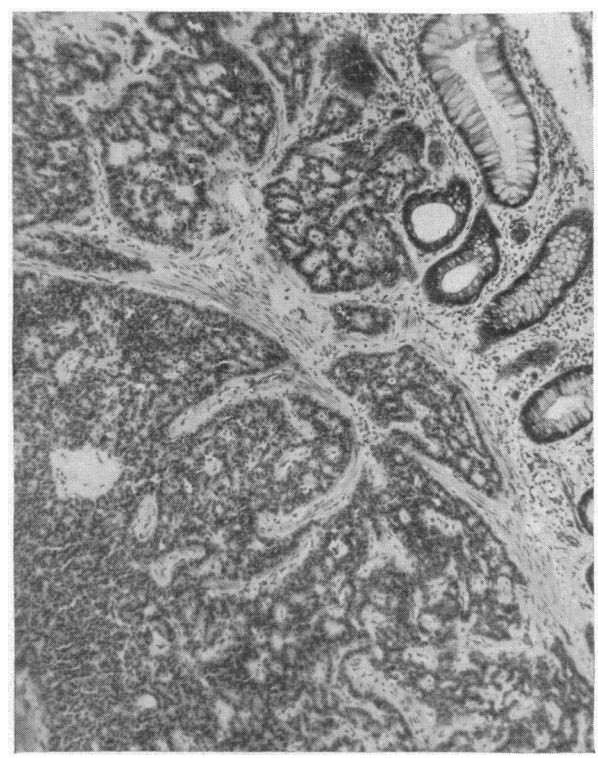

Figure 3.—Section showing carcinoid cells arranged in circumscribed sheets, whorls and rosettes surrounded by submucosal muscle fibers and connective tissue stroma (×80).

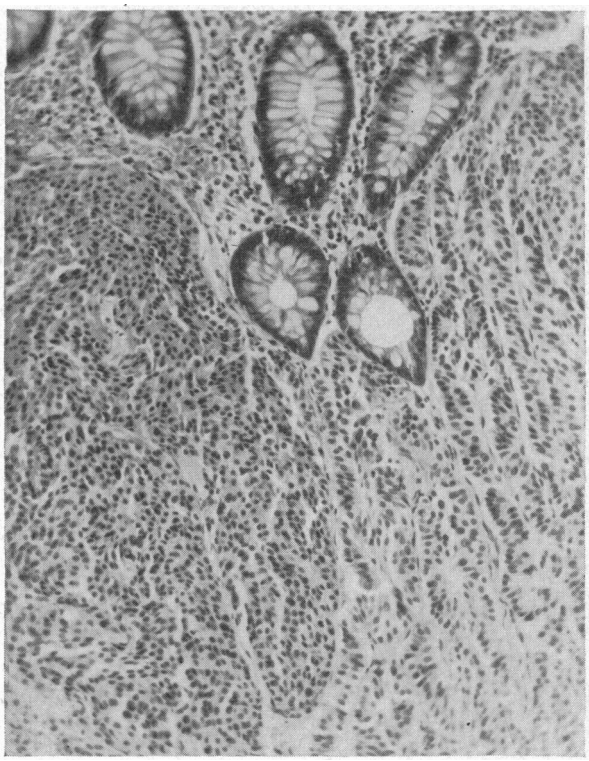

Figure 4.—Section showing submucosal carcinoid cells with small hyperchromatic oval and rounded nuclei arranged in columns and nests with a suggestion of pseudoalveolar formation. Carcinoid cells have penetrated the mucosal surface (×160).

under medical care for chronic bronchitis and cardiac disease. Upon examination, internal hemorrhoids and a prominent indurated polyp with normal mucosal covering projecting from the right posterior wall at the 7.5 cm. level were noted. The tumor was removed by diathermy snare and the base was fulgurated. The pathological diagnosis was carcinoid tumor and an argentaffin stained specimen showed scattered black granules in the tumor cell cytoplasm. The patient died of a myocardial infarct eight months later without any evidence of recurrent carcinoid tumor (see Figure 3).

COMMENT

Rectal carcinoid tumor is probably more common than is reported in the literature. In the three cases herein reported the carcinoid tumor was of the early asymptomatic type. The lesions were discovered on routine proctologic investigation. A rectal nodule firmer than the usual adenoma with a yellowish tinge should alert the clinician but diagnosis can be confirmed only by microscopic examination. In only one case did the tumor demonstrate a positive argyrophilic reaction. The author considers the prognosis excellent after local excision of the early lesions. In a fourth case, more advanced, observed by the author there was a firm sessile tumor of over 2 cm. in diameter on the anterior rectal wall 8 cm. from the crypt line, which showed infiltration and ulceration (see Figure 4). Abdominoperineal resection was done in a military hospital and no metastatic lesions were found in the pathological specimen. The patient died five years later of carcinoid metastasis. Rectal carcinoid tumor has demonstrated far greater invasive and metastatic tendencies than corresponding lesions in the appendix.

SUMMARY

Rectal carcinoid tumors are rare and slow-growing but are potentially malignant. Metastasis occurs in about 15 per cent of cases.

Early rectal carcinoid tumor is asymptomatic and is usually discovered on routine proctologic examination. Diagnosis can be established only by pathologic examination of the entire tumor. With local excision of early tumors the prognosis is excellent because of the slow-growth potential. Routine follow-up and pneumocolon are essential as with adenomata.

Large carcinoid tumors with pronounced proliferation, infiltration or ulceration should be treated by radical procedures.

760 Market Street, San Francisco 2.

REFERENCES

1. Epps, C. H., White, R. N., and Hanan, E. B.: Metastasis of rectal carcinoid to the broad ligament, J.A.M.A., 149:1205-1209, 1952.

2. Grimes, O. F., and Bell, H. G.: Carcinoid tumors of the intestine, Surg., Gyn. & Obst., 88:317-325, 1949.

3. Horn, R. C., Jr.: Carcinoid tumors of the colon and rectum, Cancer, 2:819-837, 1949.

4. Jackman, R. J.: Submucosal nodules of the rectum: diagnostic significance, Proc. Staff Mayo Clinic, 22:502-504, 1947.

5. Kunkel, W. M., Jr., Waugh, J. M., and Dockerty, M. B.: Carcinoid of the rectum with metastasis: report of a case, Ann. Surg., 139:224-229, 1954.

6. Pearson, C., and Fitzgerald, P. J.: Carcinoid tumors of the rectum; report of three cases, two with metastases, Ann. Surg., 128:128-143, 1948.

7. Pearson, C., and Fitzgerald, P. J.: Carcinoid tumors—a reemphasis of their malignant nature, Cancer, 2:1005-1026, 1949.

8. Raven, R. W.: Carcinoid tumors of the rectum, Proc. Roy. Soc. Med., 43:675-677, 1950.

9. Rigdon, R. H., and Fletcher, D. E.: Multiple argentaffin tumors (carcinoids) of the rectum, Am. J. Surg., 71: 822-824, 1946.

10. Rosser, C.: Carcinoid (neurocrine) tumors of the rectum, Surg., Gyn. & Obst., 93:486-490, 1951.

11. Saxe, D. H.: Multiple carcinoid of the rectum; case report, Am. J. Surg., 86:553-555, 1953.

12. Stout, A. P.: Carcinoid tumors of the rectum derived from Erspamer's pre-enterochrome cells, Am. J. Path., 18: 993-1109, 1942.